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MONTANA Industrial Horizons
STATE PLANNING BOARD APRIL-MAY, 1963

Conrad Plant Converts Montana Barley to Sugar for Use as Feed Supplement

Sunburst Biochemical Works, a new plant north of Conrad, will process Montana barley. The plant is housed in an orange and yellow steel building 96 feet wide, 120 feet long and 30 feet high at the eaves. A spur of the Montana Western Railroad serves the plant.

Research conducted at Montana State College has resulted in a new industry for Montana, a plant for converting barley to molasses syrup and high protein concentrates used in livestock feed.

Only One of Its Kind in World

Sunburst Biochemical Works, the first barley conversion plant of its kind in the world, was completed earlier this year and is now in production at Conrad.

Dr. Kenneth Goering, professor of chemistry at Montana State College, developed the process and is associated with the firm as research and technical director. LeRoy Anderson, of Conrad, is president and general manager. He is a graduate in chemical engineering from Montana State College and designed the factory and much of the equipment.

Enzymes Developed by MSC Professor

Enzymes are the basis for the whole process of converting barley starch into sugar at the plant and were developed by Dr. Goering. He has a nation-wide reputation in the cereal grain conversion field and is chairman of the Committee for Sugar Analysis of the American Association of Cereal Chemists.

Conversion Process

First stage in the conversion process is cleaning, milling and screening the barley. The flour produced is mixed with water, treated with the enzymes and biochemicals in large tanks and re-screened. The solids are dried in a rotary steam tube drier and re-milled into a high protein concentrate, which is sold to fortify and strengthen livestock feeds and pellets.

The approximately 30,000 gallons of thin syrup produced each day goes to a large stainless steel double effect evaporator where 1,000 gallons of water is evaporated each hour, leaving 6,000 gallons per day of thick 50 per cent sugar syrup for use in livestock feed.

Initially, the $200,000 plant will convert barley at the rate of half a million bushels per year. The barley is purchased from local growers, either through elevators or by contract with individual farmers. It is expected that the plant will be using 2 million bushels during its second year of operation.

Sunburst Biochemical Works will sell the livestock feed syrup and protein concentrate in Montana and plans to expand its markets to Spokane, Salt Lake City and the West Coast.

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MANUFACTURERS' DIRECTORY NOW AVAILABLE

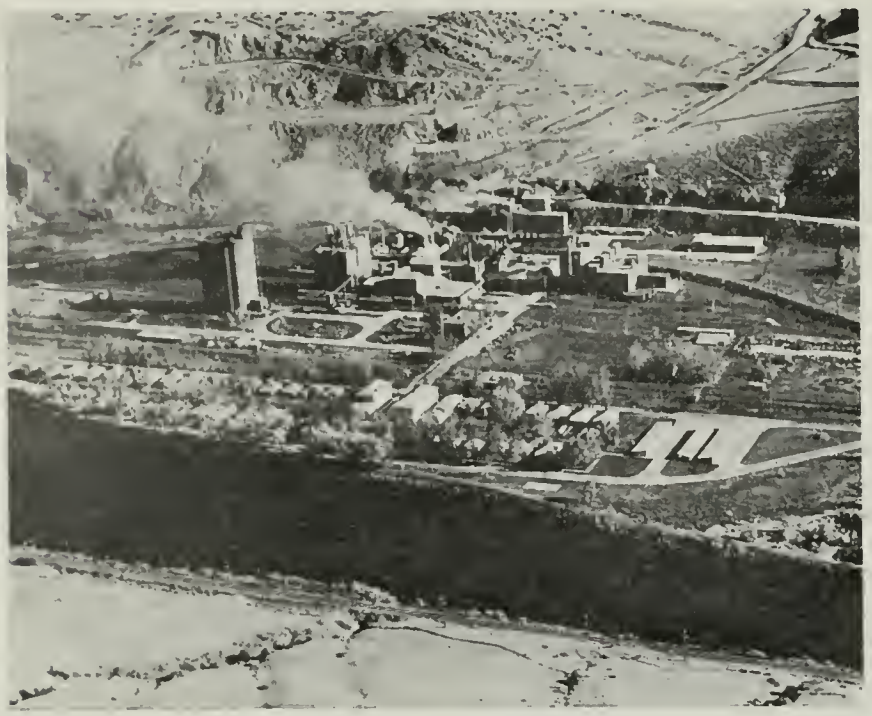
Copies of the 1963 MONTANA DIRECTORY OF MANUFACTURERS are now available from the Montana State Planning Board in Helena.

The publication is a cooperative effort of the Engineering Experiment Station at Montana State College and the State Planning Board, under the direction of Howard L. Huffman of the Industrial Engineering Department at MSC. It is published as Experiment Station Bulletin No. 28.

The 92-page directory is divided into three parts, listing about 2,000 firms according to product, alphabetically by name, and by location. Each firm is classified according to the Standard Industrial Classification Manual of the U. S. Bureau of the Budget.

The directory sells for $1.50 and may be obtained by writing to State Planning Board, Sam W. Mitchell Building, Helena, Montana.

Ideal Cement Expands Trident Plant



Trident plant of Ideal Cement Company, on the banks of the Missouri River. Limestone used in the plant comes from a quarry in the background. Yearly capacity is six million bags, compared to 2.4 million bags when production began in 1910.

Ideal Cement Co., has completed construction of six concrete cement storage silos at their Trident plant. The new silos will bring the storage capacity to 300,000 barrels.

This is part of a major construction program begun by Ideal in 1950 with the installation of two new 8-ft. by 30-ft. Traylor finish mills and four concrete bins for clinker storage. In 1961 another finish mill was installed and further additions made to the mill building. Also in 1961 a new truck garage and maintenance area was built.

The original plant had three 9-ft. diameter by 150-ft long kilns. In 1949 a fourth kiln, 8-ft. diameter by 252-ft. long was installed. Shortly after, natural gas replaced coal as fuel for the kilns.

Dates Back to 1910

Ideal Cement Co. is one of the state's oldest industries. In 1910 the first bag of portland cement was produced in Montana at Ideal's plant. It was the Three Forks Portland Cement Co. then. It became a part of Ideal in 1917.

When production began, the plant had an annual capacity of 600,000 barrels—2.4 million sacks of cement, more than enough to fill the needs of Montana cement users. Today the plant has an annual capacity of 1.5 million barrels—6 million bags. Since that first bag in 1910, Ideal has shipped over 120 million bags of cement from Trident.

All Raw Materials Found in Montana

Ideal uses Montana raw materials 100 per cent. The limestone comes from quarries adjacent to the plant. Shale is obtained from a company quarry about 5 miles east of the plant and gypsum is shipped from a company mine at Hanover, Montana. Iron ore is purchased from a private concern in northwestern Montana.

In a typical year, Trident will use about 400,000 tons of limestone, 20,000 tons of shale, 18,000 tons of iron ore and 10,000 tons of gypsum. To convert these raw materials into cement requires some of the largest moving machinery in industry today and some of the most intricate and delicate pieces of laboratory equipment available. It also requires huge volumes of natural gas and electricity. In an average year the plant will use over 28 million kilowatt hours of electricity and 1.5 million cubic feet of natural gas—enough electricity to provide all the electrical requirements for a city the size of Bozeman for slightly over a year, and enough natural gas to heat a similar sized city almost three years.

Since 1945 almost $20 million in salaries and taxes have been paid by Ideal.

V. H. Szidon, manager of the Trident plant, observes that Ideal's faith in Montana and the cement industry has been amply rewarded. "There are concrete streets and highways dating back

(Continued on page 4)

New Publications

A Survey of Mail-Order Buying Habits in Missoula County, by John S. Wright and Leo L. Knowlton, Montana State University. Reports on (1) amount and kind of mail order buying being done by potential customers in the Missoula area; (2) why these purchases are made by mail order rather than at local stores; and (3) what can be done to meet this competition. Analysis of survey reveals that the volume of mail-order purchases per family unit in that area is much higher than the national average. Among suggestions to local retailers: greater sensitivity to consumer wishes; and more sales emphasis on the total cost of mail-order buying, the service and quick delivery available from local stores, and the convenience of shopping by phone.

Prepared by the Bureau of Business and Economic Research at Montana State University, Missoula, Montana, for the State Planning Board under a grant from the Small Business Administration research grant program. Available from the Bureau for $1.00.

Montana Agriculture Basic Facts, compiled by the Cooperative Extension Service and Agricultural Experiment Station at Montana State College, Bozeman. Discusses all areas of agriculture as it exists in the state today and the Montana economy as it relates to agriculture. Accompanied by excellent statistical information, charts and tables. Revised Bulletin 293, available from Agricultural Experiment Station, Montana State College, Bozeman.

Hingham Machinist Designs, Builds Cabs for Tractors

Spring plowing need not be the miserable chore of facing the wind and weather to get the job done. Erwin (Swede) Carlson, owner of Carlson's Machine Works in Hingham, and a farmer at one time himself, designs and builds cabs for virtually every make of crawler and wheel tractor used in farming and construction work.

Soon after Carlson purchased his machine shop in 1954, he noted that, although a few companies were building tractor cabs commercially, most farmers either were building their own, or were toughing out the bitter cold days without benefit of this protection.

He learned that a great many farmers considered the cost of most of these commercial cabs to be prohibitive, and also, that in many cases they did not like the way they were designed. After talking with a number of tractor operators and getting their ideas on features they felt were desirable in a cab, Carlson worked out a design and built several pilot models. He found that he could produce a good, sturdy cab which would meet all of the requirements, and still be priced considerably below the cost of other cabs then on the market.

Farmers and tractor operators were enthusiastic, and in a short time the manufacturing of cabs became a large part of his business. The soundness of the original design for these cabs has ample testimony in the fact that in nearly ten years there has been no appreciable change in the cabs themselves. The only alterations have been those which were necessary in order to adapt to new designs and model changes in tractors.

Determined to remain competitive, Carlson has met and absorbed most of the steadily rising costs of material through the years by constantly searching for ways to cut his own production and labor costs. As a result, there has been almost no increase in the cost of the cabs to the buyer since the first ones rolled out of his shop in 1954.

While the bulk of his regular business aside from tractor cabs consists of welding and machine tool work, Carlson also handles all types of engine overhaul as well.

A few years ago, he worked out a means of repairing combine concaves. Frequent and costly replacement of the parts had long plagued combine owners. He built a special, heavy duty press to line and straighten bars bent from rocks passing through the combine. For worn bars, he first built them up with welding, and then designed a machine for grinding them down to the required tolerances. As a result, he can rebuild this costly item for approximately one-third the price of a new concave.

He is now working on a means of renewing combine cylinder bars, and experimenting with ways of hitching two tractors together in tandem allowing one operator to handle both.

Tractor cab designed and built by Erwin Carlson, owner of Carlson Machine Works in Hingham, Montana. Cabs are painted to match color of tractor before mounting. Novel hinge arrangement permits no-draft ventilation. Carlson has been building cabs since 1954.

Phosphate Plant / *Montana Phosphate Products Starts $6,000,000 Mine-Mill Project*

A $6 million phosphate mining project is underway near Philipsburg by Montana Phosphate Products Co. Development plans were announced by the company in December of 1962 when underground work of driving five tunnels to gain access to phosphate deposits began.

Construction of a $4,500,000 mill and mine service buildings is expected to begin in May. Approximately 200 men will be employed in building the mill, compressor house, machine shop, blacksmith shop, warehouse, office and dry.

To Employ 125 People

The mine, known as the Douglas, lies 12 miles north of Philipsburg. Montana Phosphate now operates phosphate rock mines near Garrison and Avon and employs 300 persons. The Douglas operation will employ an additional 125 men.

Used for Fertilizer

F. E. Burnet, vice president and general manager of the firm's headquarters office in Spokane, said that the mill will incorporate the latest developments in phosphate rock concentration. The ore will be ground, washed, and dried and the concentrate in the form of fine particles will be shipped in covered railroad hopper cars to Trail, British Columbia, for the manufacture of Elephant Brand ammonium phosphate fertilizer.

1961 Tests Prove Good

The low grade nature of the ore and the high cost of underground work have discouraged attempts to mine Douglas phosphate rock commercially during the past 30 years. Montana Phosphate acquired the property following World War II and in recent years completed an underground development program and extensive milling tests. Milling test work with 3,000 tons of phosphate rock in 1961 proved that it can be upgraded sufficiently by the flotation process, Burnet said.

In 1961 former Governor Don Nutter and State Planning Board Director Tom Collins accompanied Burnet to Trail to discuss the feasibility of the Douglas mine project with company officials.

Power for the plant will be supplied by Bonneville Power Administration with whom the company recently signed a 20-year contract.

Montana Phosphate Products Co. is a subsidiary of Consolidated Mining and Smelting Co. of Canada (COMINCO).

CONRAD PLANT

(Continued from page 1)

Starch for industrial use is also being manufactured from barley at the plant.

With additional refining, the syrup now produced can be used in fruit canning and candy industries and the management hopes to expand to producing this product and others which include yeast, to be used in food and animal feeds; glucose, also used in making

LeRoy Anderson, president of Sunburst Biochemical Works, with Dr. Kenneth Goering, research and technical director, pictured in front of stainless steel double effect evaporator.

candy and sugar in powder form; and a 70 to 80 per cent protein food for human consumption that will look like flour but it will be tasteless.

24-Hour Operation

The plant operates on a 24-hour basis and is now employing 12 people. Plant manager is Bob Wetherell, and Vice-President Douglas Anderson is business manager and general counsel.

The biochemical works is locally financed and has more than 120 stockholders from the area.

Ghost Towns Live Again

Ghost Town — Montana, a full-color promotional movie produced by the State Advertising Department, should be intriguing viewing for potential tourists to Montana this summer. Settings for the movie include several of the state's famous ghost towns such as Elkhorn, Kendall, Zortman, and Bannack, with scenes of Billings and Great Falls, Virginia City, Glacier and Yellowstone National Parks as well as Makoshika State Park.

The film was photographed last August by Promotional Films of Minnesota and depicts a typical tourist family visiting some of Montana's historic points of interest. The family is portrayed by Mr. and Mrs. Clayton Fraser and their 7-year-old daughter, Cim, and 5-year-old son, Kip. The Frasers are former Helena and Great Falls residents and native Montanans.

Orvin B. Fjare, State Advertising Director, said the 20-minute sound movie will be used primarily for television releases and is expected to be viewed by over 10 million people.

IDEAL CEMENT EXPANDS

(Continued from page 2)

to the early years of Montana's statehood; there are bridges both old and new; there are grain storage silos dotting the countryside; and there are buildings and other structures of all sizes and shapes. It is the intention of Ideal Cement Company to keep pace with the cement needs of Montana in the coming era of growth and expansion which we are confident lies ahead."

In the News . . .

Continental Oil Co. will invest approximately $10,000,000 in exploration, production, manufacturing, pipe line and marketing operations in Montana during 1963. Major portion of the investment, or more than $7,000,000, is earmarked for refinery expansion at **Billings.**

* *

President and **Mrs. Kennedy** recently presented a paperweight of **Montana green copper ore** wrapped in an 18-carat gold rope to the visiting President of Venezuela and his wife. The White House noted that the copper ore paperweight was the first in a series of specially designed gifts utilizing mineral ores native to the United States that will be given to visiting dignitaries by the Kennedys.

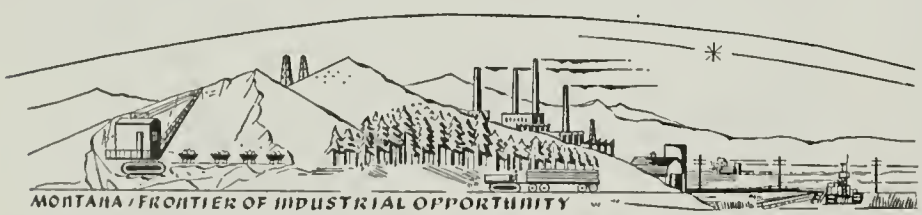
* *

February contracts for **future construction** totaled $10,701,000 in Montana, up 177 per cent compared to February, 1962, F. W. Dodge Corporation reports. Breakdown of February contracts for future construction: non-residential at $4,902,000, up 325 per cent; residential at $1,936,000, up 26 per cent; and public works and utilities at $3,863,000, up 228 per cent.

Cumulative total of construction contracts for the first two months of 1963 amounted to $15,095,000, a 101 per cent increase compared to the corresponding 1962 period, according to the Dodge report.

* * *

A construction program totalling more than $13 million was completed in Montana last year by **Mountain States Telephone Co.,** according to General Manager George I. Redhair. The firm gained nearly 6,400 telephones for a total of more than 226,000 in Montana. About 92 per cent of the state's telephones are now dial operated.



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